



X-Plain™

Spinal Cord Injury

Reference Summary

Spinal cord injuries can be very devastating. More than 10,000 Americans experience spinal cord injuries each year, mainly due to auto or falling accidents.

More than 200,000 Americans currently live with permanent paralysis of the arms, legs, or both, due to spinal cord injuries. This reference summary will help you understand how spinal cord injuries are caused and their treatment options. This program will also give you some tips on how to prevent spinal cord injuries.

Anatomy

The spinal cord is the main connection between the brain and the rest of the body. It gathers information from our arms, legs, chest, and back and sends it to the brain. This allows us to feel and touch. The spinal cord also allows the brain to send orders and messages to the muscles of the body. These messages result in our ability to breathe, move and walk.

The nerves that go from the spinal cord to the arms, legs, chest, and abdomen are called peripheral nerves.

The spinal cord is located in the spine and protected by vertebrae.

The vertebrae are solid, bony structures. They are separated by soft disks that allow the spine to bend and twist.

The human body has 24 movable vertebrae.

- 7 cervical vertebrae, numbered from C1 to C7 from top to bottom
- 12 thoracic or chest vertebrae, numbered from T1 to T12
- 5 lumbar vertebrae numbered from L1 to L5

The vertebrae are named according to their particular section of the spine and are given a specific number depending on their order. For example, the 1st cervical vertebra is C1: C for cervical and 1 because it is in the first cervical position. T stands for thoracic and L stands for lumbar. The



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tailbone or sacrum and coccyx are formed by vertebrae that are fused together, which means they do not move.

The peripheral nerves connect the spinal cord to different parts of the body. Peripheral nerves that go to the arms are connected to the spine in the neck area.

Peripheral nerves that go to the chest and abdomen are connected to the spine in the thoracic area.

Peripheral nerves that go to the legs and sexual organs are connected to the spine in the lumbar and sacral areas.

The spinal cord extends from the bottom of the skull to the top of the lumbar area. From L1 down, all the nerves go to the legs and lower body. If injured, the peripheral nerves may heal themselves and regenerate. For instance, if a person accidentally gets their finger cut off and then reattached with surgery, the nerves may grow back and the finger may feel again.

Unlike peripheral nerves, if the spinal cord is injured, it does not regenerate. This means if nerves inside the spinal cord become damaged, they cannot fix themselves and reconnect. For this reason, spinal cord injuries usually result in permanent paralysis.



Causes

Spinal cord injury can occur when the spinal cord is compressed or when the blood supply of the spinal cord is cut off. Either of these could occur when one or more vertebrae break and put pressure on the spinal cord.

Spinal cord injury can also happen if vertebrae slip on each other to the point of pressing on the spinal cord; this is called “subluxation.”

The most common causes of spinal cord injury include:

- automobile accidents
- violence
- falling
- sports injuries

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Symptoms

The symptoms of spinal cord injury depend on the location of the injury and how severe the injury is. A *complete spinal cord injury* means that the spinal cord has absolutely no function below the affected area. A *partial spinal cord injury* means that the spinal cord has some function left below the affected area.

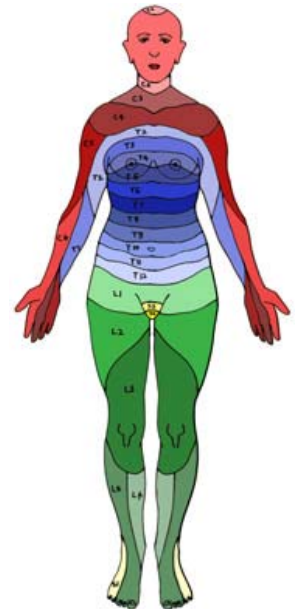
The higher an injury occurs in the spinal cord, the more affected the person will be.

A complete injury in the thoracic area of the spine causes complete paralysis in the legs, but the arms can still function. This is known as paraplegia.

A complete injury occurring between C4 and C7 causes severe weakness in the arms and total paralysis of the legs. This is known as quadriplegia.

A complete spinal cord injury occurring between C1 and C3 leaves the patient unable to breathe on his or her own and unable to move the arms or legs. A patient with a C1 injury needs a respirator in order to breathe and cannot move the arms or legs.

On the other hand, a patient with a thoracic injury can still breathe on his or her own, without a respirator. He or she could also get around in a wheelchair because the arms would not be affected.



Other symptoms that sometimes accompany spinal cord injuries include:

- pain at the site of the injury--this usually improves with time
- stiffness in the affected arms or legs, called spasticity
- sores on the skin from not being able to move around
- Other symptoms of spinal cord injuries include:
- loss of bowel or bladder control
- sexual dysfunction

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Treatment

Treatment for spinal cord injury is usually divided into 3 phases.

1. Minimizing further injury to the spinal cord.
2. Rehabilitation of the patient so he or she can function to the best possible ability.
3. Dealing with possible long-term complications.

Minimizing further injury

Two main things are usually done to minimize further injury to the spinal cord. First, the spine is realigned and immobilized. Pressure may need to be taken off the spinal cord, which could involve surgery.

Secondly, the patient receives steroid medication as soon as possible after the injury. Recent studies show that steroids may help to improve neurological function.

Rehabilitation

As soon as the spine is stable and the patient is medically stable, he or she will start intensive rehabilitation. This includes physical therapy and occupational therapy. Physical and occupational therapies aim at strengthening the remaining active muscles and teaching patients new ways to take care of themselves. The patient may also need to learn how to empty their bladder using special rubber catheters. This is called bladder catheterization. Patients may also need to re-learn how to drive in rehabilitation therapies.

Counseling and support groups may also be helpful for the patient and their family to cope with the new situation.

Managing long-term care

As time goes by, patients with spinal cord injuries need to remain watchful for any long-term complications such as bedsores, bladder infections, or severe stiffness of the joints.

The earlier long-term complications are noticed, the easier and more successful treatment is.

It is important to note that the Americans with Disabilities Act (ADA) protects paralyzed people from discrimination. Most buildings and public transportation in the United States are handicap accessible.



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Prevention

Preventing a spinal cord injury is much easier than treating it. Here are some tips for preventing them.

- Wear all required safety gear.
- Never use head-first moves, such as spearing in football, sliding head-first in baseball, or diving into shallow water.
- Avoid hitting the boards with your head in ice hockey.
- Use spotters when performing new or difficult moves in gymnastics.
- Do NOT jump from higher than 10 - 12 feet. You could break your back and suffer a spinal cord injury even if you land on your feet.

If you are present when someone is involved in an automobile or sports accident, immobilize the spine of the person that is hurt! Do not try to realign it yourself, just keep the injured person from moving.

Summary

Spinal cord injuries can be very devastating. More than 10,000 Americans are affected every year, mainly after driving or falling accidents. Unfortunately, there is currently no cure for spinal cord injury. Prevention is the BEST option! Treatment for spinal cord injuries includes 3 stages:

1. Minimize further injury to the spinal cord.
2. Rehabilitation.
3. Deal with long-term complications.

Recent medical and legal advances have made it easier for patients with spinal cord injuries to lead productive and active lives!

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